

REMARKSStatus of claims

Claims 1 to 30 are pending.

Claim 17 is amended herein.

Oath/Declaration

The Applicant has filed herewith a petition under 37 CFR 1.47. The petition specifies the employment history of the non-signing inventor, William Waller, and includes the last known address of Mr Waller. Also filed herewith is a copy of an assignment of the provisional Australian patent application, AU 2003906001 titled "Ion source control system" dated 31 October, 2003. The assignment, dated 22 January 2004, specifies that all rights to the invention covered by the provisional patent application, including the right to file patents for the invention, are vested in the named Assignee, Saintech Pty Ltd.

35 USC 112

Claim 17 stands rejected under 35 USC 112 second paragraph for failing to provide an antecedent for the term "DC voltage". Claim 17 has been amended to be dependent on claim 16.

35 USC 103(a)

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Claims 1-7, 14, 16-26 and 30 stand rejected under 35 USC 103(a) as being unpatentable over Pierrjean (US Patent No. 6,388,384) in view of Pollard et al. With respect, the Applicant disagrees.

The independent claims are claims 1, 18 and 30.

Claim 1 includes the limitation:

“the anode voltage signal comprises a voltage that modulates between a first voltage above a threshold and a second voltage below the threshold”.

Claim 18 includes the limitation:

“the anode voltage generated comprises a voltage that modulates between a first voltage above a threshold and a second voltage below the threshold”.

Claim 30 includes the limitation:

“the anode voltage generated comprises a voltage that modulates between a first voltage above a threshold and a second voltage below the threshold”.

The Office Action states that Pierrejean teaches a pulse mode electron generator in which the anode voltage signal comprises a voltage that modulates between a first voltage above a threshold and a second voltage below a threshold, as claimed in claims 1, 18 and 30. With respect, the Applicant disagrees.

Pierrejean is concerned with an electron generator. The electron generator is shown in Figure 1 of Pierrejean. The electron generator includes a cathode 1 which produces a flow of electrons 2 to an anode 3.

As is well known to a person skilled in the art, electrons flow from a cathode to an anode under the influence of a potential difference between the cathode and the anode. In Pierrejean, the potential difference is provided by the anode bias generator 26 (Column 3, lines 12-15). No further discussion of the anode bias generator 26 is provided. However, it should be noted that Figure 1 represents the anode bias generator 26 using a conventional DC voltage symbol, rather than any form of pulsing symbol as used, for example, to identify pulse voltage generator 22 which forms part of the cathode discussed below. **The indication is therefore that the potential difference 26 between the anode and cathode is fixed.**

Pierrejean is concerned with a pulsing electron generator. The cathode 1 includes a substrate 4 of electron emitting material and a grid 13. Means 20 creates a potential difference VGK between the grid 13 and the substrate 4. When the potential VGK is above an electron emission threshold VS, the substrate 4 emits electrons (column 3, lines 48-55). In order to produce a pulsing electron current, the potential VGK includes a permanent positive voltage V21 coupled with a pulsing voltage V22. When the voltages V21 and V22 combine, the potential VGK between the grid 13 and the substrate 4 is raised above an electron emission threshold.

The potential VGK is applied to the cathode 1 only and is used to produce the field that causes emission of electrons from the cathode. **Once the electrons are emitted from the cathode 1, they are attracted to the anode by the bias produced by the anode bias generator 26 which is fixed relative to the cathode 1.**

As described above, the independent claims 1, 18 and 30 require that the anode voltage includes a signal that modulates above and below a threshold.

Pierrejean teaches applying a modulating voltage to the cathode but a permanent voltage to the anode. The operation of the cathode is substantially independent of the operation of the anode. In Pierrejean, the modulating voltage on the cathode produces an intermittent emission of electrons. In the present application, the emission of the electrons from the cathode may or may not be intermittent. However, the anode voltage, which controls the flow of electrons to the anode, modulates above and below a threshold. **Pierrejean does not teach that the anode voltage may modulate above and below a threshold.** Accordingly, the independent claims 1, 18 and 30 and their respective dependent claims are novel in light of Pierrejean.

Pollard suggests only pulsed electron generators, not pulsed anodes and therefore the combination of Pierrejean and Pollard does not teach that the anode voltage may modulate above and below a threshold. Accordingly, the independent claims 1, 18 and 30 and their respective dependent claims are patentable over the combination of Pierrejean and Pollard.

In addition to the above distinctions, Pollard teaches a mass spectrometer while Pierrejean teaches an electron generator for a mass spectrometer. By contrast, the present invention teaches and claims an ion source. While a mass spectrometer and an ion source may both ionize a gas, the gas provided to the mass spectrometer may be considered a sample for analysis. Furthermore, the ionized gas must be directed to a detector in order to analyze the gas sample and thus a mass spectrometer does not emit any form of ion beam. Furthermore, the mass spectrometer gas supply is a complex component that requires a separate chamber and extraction system. **A person skilled in the art would**

readily understand that a mass spectrometer is not an ion source, that a mass spectrometer has a very different construction to an ion source and that a mass spectrometer has a very different application to an ion source. Accordingly, Pollard in combination with Pierrejean teaches only a mass spectrometer and does not teach an ion source. Therefore, claims 1, 18 and 30 and their respective independent claims are patentable over Pollard and Pierrejean.

Claim 2

Claim 2 stands rejected under 35 USC 103(a) as being unpatentable over Pierrejean in view of Pollard.

Claim 2 includes the limitation:

“wherein the threshold is an ionization threshold”.

In rejecting claim 2, the Office Action states that Pierrejean teaches the electron emission threshold of the cathode. The Office Action further states that when combined with Pollard, the electron emission threshold becomes the ionization threshold. With respect, the Applicant disagrees. The purpose of Pierrejean is to provide a pulsing electron current. Pierrejean produces a pulsing electron current by modulating the voltage of a grid (grid 13 in Figure 1) above and below an emission threshold voltage VS of the cathode 1.

The Office Action states the Pierrejean may be combined with Pollard and that when combined with Pollard, the electron emission threshold may be considered to be the ionization threshold. With respect, this is a confusing statement by the Office. One

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interpretation that could be given to this statement considers that the grid 13 should be modulated to above an ionization voltage of the gas used in Pollard. However, the grid 13 is used only for causing emission of the electrons from the cathode. If the ionization threshold is below the emission threshold, then biasing the grid 13 to the ionization threshold will not produce any electron emission and the cathode will not function. Alternatively, if the ionization threshold is well above the electron emission threshold, there is no teaching or suggestion that the cathode will operate satisfactorily as an electron source. In addition, excess voltage on the grid 13 may provide interference with the Gate and grids V0 and V1 of Pollard. Accordingly, under this interpretation, it is **inappropriate to consider that the electron emission voltage may be simply interchanged with the ionization voltage.**

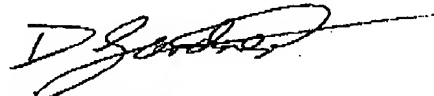
Under an alternative interpretation, perhaps the Office considers that the cathode modulation may be provided in the grids of Pollard. However, Pierrejean teaches only a pulsing electron generator. If the grids of Pollard were to be modulated, then the electron source would need to produce a continuous electron emission, which is not taught or suggested by Pierrejean. In addition, Pollard teaches no pulsing components. Thus a combined teaching of Pollard and Pierrejean, as suggested at column 1, line 40 of Pierrejean would only allow a pulsing electron source, to which the first interpretation discussed above would apply.

Accordingly, the combination of Pollard and Pierrejean does not teach or suggest the subject matter of claim 2 and thus claim 2 is patentable over Pierrejean in view of Pollard.

Conclusion

The Applicant has presented amendments and submissions that the Applicant considers address all of the issues raised in the Office Action and places the application in condition for allowance. Further consideration of the application is therefore respectfully requested.

Respectfully submitted,



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